



# PHYSICS NMDCAT

TOPIC WISE TEST (UNIT-4)

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**TOPIC:**

✓ **Waves**

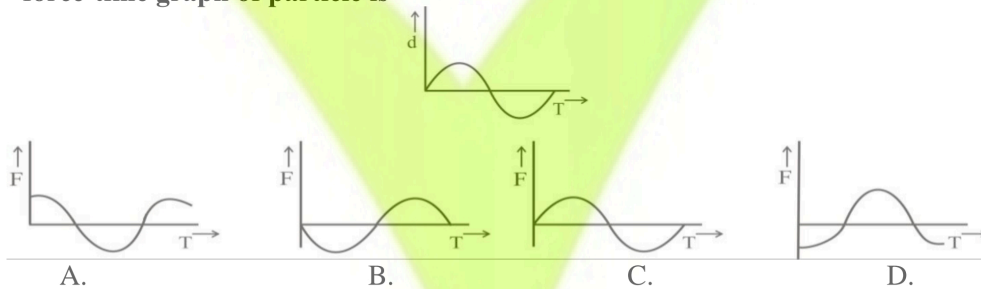
- Q. 1** A wave generator produces 500 pulses in 10 seconds. Find period of pulses it produces
- A. 50s  
B.  $\frac{1}{50}$  s  
C.  $\frac{1}{5}$  s  
D.  $\frac{10}{50}$  s
- Q. 2** The speed of sound in the direction of wind relative to ground (where v is speed of sound and  $v_w$  is speed of wind)
- A. v  
B.  $v - v_w$   
C.  $v + v_w$   
D.  $v \pm v_w$
- Q. 3** The speed of a wave on a particular string is  $24 \text{ ms}^{-1}$ . If string is 6m long. Find its fundamental frequency
- A. 2 Hz  
B. 6 Hz  
C. 4 Hz  
D. 8 Hz
- Q. 4** The restoring force of SHM is maximum when particle:
- A. Displacement is maximum  
B. Half way between them  
C. Crossing mean position  
D. At rest
- Q. 5** In Doppler effect if the source moves towards the observer, the spectral line are shifted towards the
- A. Blue end of spectrum  
B. Either end of the spectrum  
C. Red end of spectrum  
D. None of these
- Q. 6** The distance between two consecutive antinodes is 0.5m. The distance travelled by the wave in half the time period is
- A. 2 m  
B. 0.5 m  
C. 1 m  
D. 0.25 m
- Q. 7** The phase difference between the particles vibrating at two consecutive nodes is:
- A. Zero  
B.  $\pi$   
C.  $\frac{\pi}{2}$   
D.  $2\pi$
- Q. 8** The third harmonic in an open organ pipe is known as
- A. Fundamental frequency  
B. Third overtone  
C. Second overtone  
D. First overtone
- Q. 9** Which of the following laws of strings is not correct? Where "f" is frequency of string.
- A.  $f \propto \frac{1}{\sqrt{m}}$   
B.  $f \propto \sqrt{T}$   
C.  $f \propto \ell$   
D.  $f \propto \frac{1}{\ell}$
- Q. 10** Which of the property makes difference between progressive and stationary waves
- A. Amplitude  
B. Frequency  
C. Propagation of energy  
D. Phase of the wave
- Q. 11** The first overtone of a stretched wire of given length is 320 Hz. The first harmonic is:
- A. 320 Hz  
B. 160 Hz  
C. 480 Hz  
D. 640 Hz



- Q. 12 When an observer is approaching a stationary source with a velocity  $v_o$  then the apparent change in frequency observed by him will be:
- A.  $\frac{v}{v + v_o} f$  B.  $\left(1 + \frac{v_o}{v}\right) f$   
C.  $\frac{v}{v_o} f$  D.  $\frac{v_o}{v} f$
- Q. 13 A source of sound of frequency 450 cycles/sec is moving towards a stationary observer with 34 m/sec speed. If the speed of sound is 340 m/sec, then the apparent frequency will be
- A. 410 cycles/sec B. 500 cycles/sec  
C. 550 cycles/sec D. 450 cycles/sec
- Q. 14 Sonar is used to detect
- A. Depth of sea B. Under sea objects  
C. Location of submarine D. All of these
- Q. 15 What would be the effect of increasing tension of stretched string on velocity of waves
- A. Increases B. Decreases  
C. Remain unchanged D. None of these
- Q. 16 If water waves oscillates up and down three times each second and distance between waves crest is 2, what is its wave speed.
- A. 3m/s B. 6m/s  
C. 1.5m/s D. 9m/s
- Q. 17 The essential properties of a medium for the propagation of mechanical waves are
- A. Inertia and mass B. Inertia and elasticity  
C. Elasticity only D. Inertia only
- Q. 18 What is the ratio of velocity to fundamental frequency for a closed organ pipe of length  $l$  ?
- A. 0 B.  $l$   
C.  $2l$  D.  $4l$
- Q. 19 The frequency of a sound wave is  $n$  and its velocity is  $v$ . If the frequency is increased to  $4n$ , the velocity of the wave will be
- A.  $v$  B.  $2v$   
C.  $4v$  D.  $v/4$
- Q. 20 The nature of sound waves in gases is
- A. Transverse B. Longitudinal  
C. Stationary D. Electromagnetic
- Q. 21 The distance between a node and the next anti node of a stationary wave is 33 cm. If the velocity of sound is 330 m/s. The frequency is
- A. 150 Hz B. 200 Hz  
C. 250 Hz D. 300 Hz
- Q. 22 When an aero plane move towards airport, then the frequency of reflected wave from the aeroplane received by radar
- A. Decreases B. Increases  
C. Remain some D. Become zero
- Q. 23 The frequency of a rod is 200 Hz. If the velocity of sound in air is  $340 \text{ ms}^{-1}$ , the wavelength of the sound produced is
- A. 1.7 cm B. 6.8 cm  
C. 1.7 m D. 6.8 m
- Q. 24 An observer moves towards a stationary source of sound, with a velocity one fifth of the velocity of sound. What is the percentage increase in the apparent frequency?
- A. zero B. 0.5%  
C. 5% D. 20%
- Q. 25 Standing waves are produced in 10m long stretched string. If string vibrates in 5 segments and wave velocity is 20m/s, what is the frequency?
- A. 10Hz B. 5Hz



- C. 20Hz  
D. 4Hz
- Q. 26 If a string is fixed at both ends vibrates in “n” loops, then wave-length in term of length ' $\ell$ ' of string is given by
- A.  $\frac{n\ell}{2}$   
B.  $\frac{\ell}{2n}$   
C.  $\frac{2\ell}{n}$   
D.  $\frac{2\ell}{v}$
- Q. 27 When two identical traveling waves are superimposed, velocity of resultant wave
- A. Decreases  
B. Increases  
C. Remains same  
D. Becomes zero
- Q. 28 The distance between 1<sup>st</sup> node and 4<sup>th</sup> antinode is:
- A.  $\frac{7}{4}\lambda$   
B.  $5\frac{\lambda}{4}$   
C.  $13\frac{\lambda}{4}$   
D.  $11\frac{\lambda}{4}$
- Q. 29 In the stretched string if speed of the wave is doubled, the tension will be
- A. 2 times  
B. 4 times  
C. 8 times  
D. 6 times
- Q. 30 Displacement time graph of particle executing SHM is shown. The corresponding force-time graph of particle is



- Q. 31 The distance covered by a body in **one complete vibration** is 20cm. What is the amplitude of body  
A. 10 cm  
B. 15 cm  
C. 5 cm  
D. 7.5 cm
- Q. 32 If V is the speed of sound at pressure P then speed of sound at 2P, keeping temperature constant, will be  
A. 1 : 2  
B. 1 : 1  
C. 2 : 1  
D.  $\sqrt{2} : 1$
- Q. 33 Which of the following has maximum value of  $\gamma = \frac{C_p}{C_v}$   
A. Monoatomic gas  
B. Polyatomic gas  
C. Diatomic gas  
D. All have same value
- Q. 34 Velocity of sound in air  
A. Decreases with increase in temperature  
B. Increase with decrease in temperature  
C. Decreases with decrease of temperature  
D. Does not depend on temperature
- Q. 35 At what temperature, the velocity of sound will be double its value at 273 K?  
A.  $2 \times 273$  K  
B.  $8 \times 273$  K  
C.  $4 \times 273$  K  
D.  $16 \times 273$  K
- Q. 36 Doppler's effect will not be applicable when the velocity of sound source is  
A. Equal to that of the sound velocity  
B. Less than the velocity of sound  
C. Greater than the velocity of sound  
D. Zero
- Q. 37 For all gases  
A.  $v_t = v_o \sqrt{1 - \frac{t}{273}}$   
B.  $v_t = v_o \sqrt{1 + \frac{t}{273}}$



C.  $v_t = v_o \sqrt{1 + 273t}$

D.  $v_t = v_o \sqrt{1 + \frac{273}{t}}$

**Q. 38** A source emits a sound of frequency of 400 Hz, but the listener hears it to be 390 Hz. Then

- A. The listener is moving towards the source
- B. The source is moving towards the listener
- C. The listener is moving away from the source
- D. The listener has a defective ear

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- Q. 39** Sound travels faster in moist air at STP because  
A. Moist air is heavier than dry air  
B. The pressure of moist air is greater than that of dry air  
C. The value of  $\gamma$  of moist air is greater than that for dry air  
D. The density of moist air is less than that of dry air
- Q. 40** Newton assumed that sound propagation in a gas takes place under  
A. Isothermal conditions  
B. Isobaric condition  
C. Adiabatic conditions  
D. Isochoric condition
- Q. 41** If  $v_a$ ,  $v_h$  and  $v_m$  are the speeds of sound in air, hydrogen and a metal at the same temperature, then  
A.  $v_h > v_a > v_m$   
B.  $v_m > v_h > v_a$   
C.  $v_h > v_m > v_a$   
D.  $v_a > v_h > v_m$
- Q. 42** A tuning fork completes 20 vibrations in 0.4 s. its frequency in ( $s^{-1}$ )  
A. 50  
B. 60  
C. 100  
D. none of these
- Q. 43** If the number of loops of a stationary wave are increasing, then  
A.  $\lambda$  increases  
B.  $\lambda$  decreases  
C.  $\lambda$  remains same  
D.  $\lambda$  may increase or decrease
- Q. 44** A rope of length 5 m is stretched to a tension of 80 N. If its mass is 1 kg, at what speed would a 10 Hz transverse wave travel down the string?  
A. 2 m/s  
B. 5 m/s  
C. 20 m/s  
D. 50 m/s
- Q. 45** At which temperature the speed of sound in hydrogen will be same as that of speed of sound in oxygen at  $100^\circ\text{C}$   
A.  $-148^\circ\text{C}$   
B.  $-212.5^\circ\text{C}$   
C.  $-317.5^\circ\text{C}$   
D.  $-249.7^\circ\text{C}$
- Q. 46** A stationary wave is set up in the air column of a closed pipe. At the closed end of the pipe:  
A. Always a node is formed  
B. Always an antinode is formed  
C. Neither node nor antinode is formed  
D. Sometimes a node and sometimes an antinode is formed
- Q. 47** A string, clamped at its ends, vibrates in three segments. The string is 100cm long. The wavelength is:  
A. 33.3cm  
B. 150cm  
C. 66.7cm  
D. 300cm
- Q. 48** A police motor cycle running at 130 Km/hr sounds a siren of 2 KHz frequency while chasing a car running at 150 Km/hr. the apparent frequency of the siren heard by the car driver will be:  
A. Greater than 2 KHz  
B. 2 KHz  
C. The siren will not be heard by the car driver  
D. Less than 2 KHz
- Q. 49** Length of a string tied to two rigid supports is 40 cm. Maximum length (wavelength in cm) of a stationary wave produced on it, is  
A. 20  
B. 10  
C. 80  
D. 40
- Q. 50** In strings, the position of antinodes are obtained at  
A.  $\lambda, 2\lambda, 3\lambda$   
B.  $2\lambda, 4, 6\lambda$   
C.  $0, \frac{\lambda}{2}, \lambda$   
D.  $\frac{\lambda}{4}, \frac{3\lambda}{4}, \frac{5\lambda}{4}$

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# Phy T-4

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Regards.Huzaiifa Saeed,Usama Sohail



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